

Notice of Allowability

Application No.

09/990,366

Applicant(s)

LIU ET AL.

Examiner

David S. Kim

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2633

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 14 June 2005.
2. ☒ The allowed claim(s) is/are 12,22 and 23 (now renumbered as claims 1-3).
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some* c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☒ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
- (b) ☒ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|---|---|
| 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____ |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____ |

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EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Dr. Victoria Donnelly on Monday, 31 October 2005. The application has been amended as follows:

In the claims

Claim 12 (now renumbered as claim 1, strikethrough portions are deletions and underlined portions are additions).

A method for monitoring performance of an optical network, comprising the steps of:

(a) intensity modulating each of optical wavelength channels channel of ~~an~~ a multi-channel optical signal, traveling through a section of a fiber between two nodes in the optical network, with the same fiber identification (FID) tone, which is a low frequency dither tone whose frequency is unique to the fiber section;

(b) measuring a power level of the FID tone at various locations in the optical network; ~~and~~

(c) indicating the possibility of one or more of the following:

(i) the fiber section failure if the FID tone is not present;

(ii) an amplifier failure in the optical network if combined power levels of different FID tones at different dither tone frequencies decrease substantially uniformly;

(iii) a transponder failure if the power level of the FID tone decreases provided that no optical wavelength channels are being dropped from the respective network node; ~~or~~ and

(iv) adding or dropping optical wavelength channels to the fiber section if the power level of the FID tone changes;

and

(d) visualizing an approximate traffic load through different fiber sections in the optical network by comparatively displaying power levels of FID tones at different FID tone frequencies, thus indicating

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that fiber sections having higher power levels of the FID tones carry larger numbers of optical wavelength channels.

Claim 24 (cancelled).

In the specification

On page 11, line 10, replace “fiber section 14 connects nodes 16 and 18” with -- fiber section 24 connects nodes 16 and 18 --.

On page 15, line 22, replace “wherein $j = 1, \dots, m$ ” with -- wherein $j = 1, \dots, m$ --.

On page 15, line 23, replace “combined power levels 220 of FID tones” with -- combined power levels 220a of FID tones --.

On page 16, line 6, replace “index $k = 1, \dots, m$ ” with -- index $k = 1, \dots, n$ --.

Regarding paragraph [0039] on pages 18-20, note the following corrections (strikethrough portions are deletions and underlined portions are additions):

By a way of example, Figure 6 illustrates an optical network 300 having a plurality of network nodes, four of them being shown in Figure 6 as nodes A, B, C and D and designated by reference numerals ~~312, 314, 316 and 318~~ 212, 214, 216 and 218 respectively. The network 300 of the second embodiment is similar the network 10 of the first embodiment except for the pairs of nodes now being connected with bundles of fibers, each bundle having more ~~network 300 of the second embodiment is similar to the network 10 of the first embodiment except for the pairs of nodes now being connected with bundles of~~ fibers, each bundle having more than one fiber section. Five bundle sections 220, 221, 222, 223 and 224 connecting the four nodes of the network 300 are shown in Figure 6. In more detail, the bundle section 220, including fiber sections 225, 226 and 227, connects nodes ~~312 and 314~~ 212 and 214; bundle section 221, including fiber sections 228 and 229, connects nodes ~~314 and 316~~ 214 and 216; bundle section 222, including fiber sections 230 and 231, connects nodes ~~316 and 318~~ 216 and 218; bundle section 223, including fiber sections 232 and 233, connects nodes ~~318 and 312~~ 218 and 212; and bundle section 224, including fiber sections 234, 235 and 236, connects nodes ~~314 and 318~~ 214 and 218. Each optical signal

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(wavelength channel) traveling through a bundle section is marked with a unique bundle identification (BID) dither tone associated with the ~~bundle~~ bundle section. The fibers in a bundle are separated at each network node, and each fiber is encoded (modulated) with a unique lower frequency BID dither tone (preferably <1 MHz) having shallow modulation depth, e.g. 1-5% so that the frequency of the dither identifies the particular bundle of fibers. Optionally, an additional FID tone can be encoded onto the wavelength channel in a manner described above with reference to the first embodiment of the invention, thus each channel carrying two identification tones, a BID tone, and a FID tone. Further to the above, an optional CID tone can be encoded onto the optical signal in addition to the FID and BID tones.

In the abstract

Note the following corrections (strikethrough portions are deletions and underlined portions are additions):

The invention describes methods and systems for monitoring the performance of an optical network by introducing a fiber identification (FID) tag and/or bundle identification (BID) tag which are unique to the fiber section and to the bundle of fibers respectively. The FID tag is introduced by marking an optical signal, traveling through a section of fiber, with a low frequency dither tone whose frequency is unique to the fiber section. Similarly, the BID tag is introduced by marking an optical signal, traveling through a section of fiber in a bundle of fibers, with another low frequency dither tone whose frequency is unique to the bundle section. Detecting of the FID and BID tones either alone or along with an optionally introduced channel identification (CID) tone, ~~which is unique to the optical signal, provides more effective and accurate monitoring of performance of the optical network and allows determining of the network topology, e.g. paths of optical channels and traffic load through different fiber sections in the~~ network is provided.

In the drawings

2. The following changes to the drawings have been approved by the examiner and agreed upon by applicant:

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In Fig. 2, insert one instance of the reference character "115" next to the lead line that points to the CID Encoder in Node A and insert another instance of the reference character "115" next to the lead line that points to the CID Encoder in Node B.

In Fig. 5, replace all instances of reference character "220" with -- 220a --.

In Fig. 6, one instance of reference character "230" is used for FID #12 and another instance of reference character "230" is used for FID #7. Replace the former instance with -- 236 --. See page 19, lines 12-13 for support.

In Fig. 7, delete the lead lines on the right side of each CID Encoder.

In order to avoid abandonment of the application, applicant must make these above agreed upon drawing changes.

3. The following is an examiner's statement of reasons for allowance:

The prior art of record discloses marking each optical wavelength channel in a multi-channel optical signal with the same dither tone (see U.S. Patent No. 5,745,274 to Fatehi et al., col. 4, lines 11-16; see U.S. Patent No. 6,559,984 B1 to Lee et al, Fig. 6, col. 6-7). However, the prior art of record does not disclose the step of visualizing an approximate traffic load through different fiber sections in the optical network by comparatively displaying power levels of FID tones at different FID tone frequencies, thus indicating that fiber sections having higher power levels of the FID tones carry larger numbers of optical wavelength channels.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Ji et al. provides teachings on various uses of tones in optical networks and includes an extensive list of relevant references.

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5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David S. Kim whose telephone number is 571-272-3033. The examiner can normally be reached on Mon.-Fri. 9 AM to 5 PM (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on 571-272-3022. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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